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VERMONT'S PART IN INDUSTRY

By Ralph W. Putnam

History is not, as we have gently insinuated in our editorial notes, a mere matter of men and events, battles and battle grounds; it is far more, or should be—the recreation of industries, the retelling of the human mind and spirit trying to fashion a livable and more comfortable and secure world. From the very beginning, Vermonters were not only interested in making a homeland with axe and musket, but also in working out a way of living with what was at hand. Chasing the Yorkers out of the Grants was spectacular; battling their environment with practical weapons was certainly as important in many ways. The paper which we are offering on Vermont's part in industry was prepared for a club of professional and business men. We asked Mr. Putnam to give us the pleasure of making it more widely useful, and he assented with the warning that it represents nothing original in research, simply is an assembling of information that he found interesting. He quotes the late Will Rogers—"All I know is what I read in the papers." His point of view, he adds, is reflected in this statement by Calvin Coolidge: "We review the past, not in order to return to it, but that we may find in what direction it points to the future." Editor.

The early pioneers who settled Vermont were, in many respects, a choice people. They were of Scotch, Irish, and English descent, bold, adventuresome, and enterprising. They were young in years, their average age being twenty-six years. They left the older settled portions of New England to establish new homes in the wilderness in what was then the New Hampshire Grants. They came into the wilderness with a rifle, an axe, a few farming tools, and a bag of seeds, strapped upon the back of the family horse, or upon their own shoulders, knowing that their very life, and their ability to survive, depended upon their own industry and courage. It is hard for us, you and me (their children), to visualize the courage—the energy of mind—that prompted these sturdy settlers to leave home and friends, and to attempt to weld, out of the forest solitude, a home for wife and children.

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The English Colonies in America were exploited upon the old English Mercantile system, that of England being supported by her possessions. All raw materials and farm products were produced for consumption by the Mother Country. No English colony was encouraged to manufacture or to fabricate. The Colonies must purchase manufactured goods from England, and thereby enrich England. This repressive policy held in check the industrial development of the American Colonies and added fuel to the flame of dissension that led to the American Revolution. The settler was, of necessity, a farmer. With the axe, the auger, the shave and the jack-knife, the farmer-settler formed the tools for his labor. If he broke his axe-helve, chopping in the forest, he made a new one from the stick of tough ash seasoning in his lean-to shed. If one of the oxen broke a bow, a new one was shaped and ready for its place. The yoke itself was of his forming. Clad in homespun, he sat down to eat his humble meal in a home, built with his own hands, on a chair that he fashioned, at a table of his making, and ate from home-made dishes food that had ripened in the sun, that daily passed across the blue, over his little clearing. In his every step he was a marvel of resource and self-reliance. The forest gave him material for shelter and for tools; the soil gave him food.

His first labor when he arrived at his "pitch" was to find a stream or a spring. Here he cleared a small space and in the opening in the forest built a shelter to protect him from the storms. In your tramps over Vermont’s hillsides, when you find an old cellar hole, near it you will find a brook, a stream, or a caved-in well. After the shelter, or log-cabin was built, our pioneer settler attacked the forest. He cut down the trees, rolled them into piles and burned them. Many a settler who followed the pioneer into the new country, was guided on his way by the smoke and odor from the axe-man’s fire. The hardwood trees were separated from the spruce, fir, and pine, and the hardwood ashes leached to form lye. This lye formed potassium carbonate, or potash. Potash was used in the making of soap and glass. When refined it became pearl ash, carbonate of potash, or saleratus, used for the same purpose as we now use soda. Potash was the first Vermont produce to have a money value. It is of interest to note, that the first patent issued by the U. S. Government,—patent No. 1,—was granted July 31st, 1790, to Samuel Hopkins of Burlington, for a process of making potash.

The first mechanical appliance of the early settler was the plump-
ing mill. This device was used to crush corn. A saucer-shaped hole was fashioned in the top of a hardwood stump. To a live sapling was fastened, by a raw-hide lace, a piece of wood or a stone shaped to fill the saucer-shaped cavity. Corn was placed in the cavity, and by plumping the weight up and down, the corn was crushed. This was a slow and laborious operation, and necessity led to the community grist mill. These mills were located on a water-power site and were the first industry.

The town of Arlington gave fifty acres to Remember Baker, who built on East Brook the first saw and grist mill.

Next came the sawmills. The natural resources of Vermont laid the foundation for its manufacturing. Many towns offered a bounty to the person who would erect a mill.

Matthew Lyon, in 1796, owned a printing office, and made his paper from basswood bark.

Iron was in great demand, and so the settlers searched out the bog iron in the vicinity of their homes, and erected smelters and forges.

Matthew Lyon built a dam on the river at Fair Haven and made iron as early as 1785.

Ira Allen constructed a dam at Winooski Falls, and built a gristmill, two sawmills, a furnace, and two forges.

There was a furnace in Tinmouth in 1783. Also at Middletown and Vergennes. One in Bennington. Two in Wallingford. One was built in Sheldon in 1799. One in Swanton in 1800. In Sheldon more than 100 men were employed, and the iron produced was called "Sheldon Currency."

A stone quarry was opened in Isle La Motte before 1796.

Isaac Underhill opened the Dorset marble quarry in 1785. Marble headstones were first made there in 1808.

The Middlebury quarry was opened in 1803, and the first marble-saw was used there.

The first marble mill in Swanton was built in 1812.

Slate and brick were among the early industries. Glass was made in Brandon in 1811.

The early settlers made their own shoes and clothing. Hides from the animals, wool from the flocks, flax from the soil. Spun on the wheel, dyed from the barks and roots. Not until 1781 was there a woolen mill.
Cotton cloth was first made in 1820 by Isaac Fisher, Jr., of Springfield.

Two Windsor County towns stand out in mechanical history, as the birthplace of Vermont industry—Windsor and Springfield—and Vermonters should reverence the inventors, their early forebears, who gave so liberally of their inventive genius.

Joseph Wickham Roe, one of the leading industrial historians and mechanical engineers, has said, “but few plants have had so great an influence upon American manufacturing, as has the mechanical developments issuing from Windsor.”

There was no particular reason why Windsor should have played so prominent a part in the industrial world. It lacked transportation; it was at a distance from large populated centers; it was small in the number of its people.

Mill Creek, a stream flowing into the Connecticut, has a fall of sixty feet within a third of a mile, and here in August 1764 came Steele Smith. Following Smith came Israel Curtis, who built a saw-mill on the upper fall, and a grist mill on the lower fall. At these two falls was started the mechanical history of Windsor.

The War of 1812 demonstrated to the American people that to survive they must be self-dependent.

A little carding-mill was built on the falls and later was converted into a weaving plant that manufactured cloth from the wool of the native sheep. In 1818, this plant went out of business, being unable to compete with imported goods brought in after the close of the war.

The year 1815 marks the beginning of the era of Windsor inventors. The first of these inventors was Lemuel Hedge, who on June 21, 1815, patented a process for ruling blank-books, and on March 3, 1817, a revolving machine for the same purpose. Thomas Pomroy was the town printer. Pomroy and Hedge formed a partnership and manufactured the ruling machine, until their shop burned. This Hedge patent is the basis for all modern ruling machines now in use.

In 1827, we find Hedge as the inventor and patentee of an “Engine for Dividing Scales.” This invention was of national importance in the development of the machine industry, as it made possible, by quantity production, the interchangeability of manufacture. Hedge started manufacturing these machines in Windsor, but lacking capital, moved to Brattleboro. After some years his concern was absorbed by the Stanley Rule & Level Co., of New Britain, Conn. Hedge also invented the two-foot folding rule, and in 1849, the
band-saw, used over the world in exactly the same form as when perfected by Lemuel Hedge.

In July, 1827, John M. Cooper of Guildhall came to Windsor to build the Cooper rotative piston pump. Cooper was on the right track, but did not go far enough, and his pump failed to work.

Next came Ashahel Hubbard, a resident of West Windsor, who in 1828 patented the "Revolving Hydraulic Pump." Jabez Proctor, father of the late Senator Redfield Proctor, furnished the funds, and the National Hydraulic Co. was organized. The pump manufactured by the company, unchanged in principle, is still being used for pumping water, oil, and for use in fire-engines.

Did you know that the gunsmiths of America came from Vermont, and that the modern rifle was "born" in Windsor? Nicanor Kendall, a native of West Windsor, invented the Kendall rifle. Kendall married the daughter of Ashahel Hubbard, and with his father-in-law, Hubbard, started the manufacture of the rifle. Two of the original rifles are in the museum in the Tower of London. One is in the collection of the Vermont Historical Society. Hubbard sold out to Kendall in 1839, and in 1843 Kendall arranged a partnership with Richard Smith Lawrence of Chester, Vermont. Funds were needed, so Samuel E. Robbins was taken into the firm, which then became Robbins, Kendall, and Lawrence.

Ten thousand rifles were made and sold to the U. S. Government for use in the Mexican War, at a selling price of $10.90 each. In 1847, men in the plant of Robbins & Lawrence Co., Windsor, Vermont, worked diligently to complete a government order for 10,000 rifles. The terms of the contract called for completion of the work in three years, but the Robbins & Lawrence workers finished eighteen months ahead of schedule. The guns were delivered. Mr. Lawrence traveled to Washington and was told by Gen. Talcott of the Ordnance Board that it was the only gun contract ever finished within the contract time. "A fine stand of arms, Sir . . . 62% passed inspection," said the General; and on the face of such superb manufacturing, a new contract for 15,000 more rifles was awarded immediately. This was modern efficiency ninety years ago, when a thirty-eight per cent scrap loss was not frowned upon. But what of to-day?

Mr. Kendall withdrew from the company in 1849, leaving Lawrence as the managing head.

Lawrence brought some remarkable "inventors" into his organiza-
tion: men whose names came to mean—firearms. These men were
Henry D. Stone and Frederick W. Howe, who with Richard Law-
rence are ranked among the great American mechanical geniuses.
Other men whom Mr. Lawrence interested in his plant were Ben-
jamin Henry, Daniel Wesson, Christian Sharpe. Mr. Henry was
the grandson of Benjamin Tyler, who supplied the bog iron from
his West Claremont iron works for the early Windsor mechanics.

Lawrence and Henry corrected the faults of the Jennings repea-
ting rifle, and it became the “Henry Rifle” of the Civil War days.
When Governor Winchester founded his company, this Henry rifle
became the Winchester repeating rifle.

Daniel Wesson founded the Smith & Wesson Co. Christian
Sharpe invented the breech-loading rifle and brought it to Windsor
in 1848.

The sharp shooter of the Civil War was not so called from his
eyesight, but from his Sharpe rifle that he carried.

Robbins & Lawrence Co. originated the “Interchangeable U. S.
Army Rifle,” the parts of which could be mixed and reassembled
upon the field. Six of these rifles were exhibited at the Crystal Pal-
ace in London, in 1851, and 25,000 were manufactured at Windsor
for the English Government and used in the Crimean War. This
rifle became the English Enfield. All the finest rifles used through-
out the world can be traced to Windsor inventors.

The English Government’s order for 25,000 rifles for use in the
Crimean War proved unfortunate for the financial success of Robbins
& Lawrence and in 1856 the concern went into receivership. A new
company was formed and guns were made for use in the Civil War.

Henry D. Stone had invented the turret lathe and as the years
passed by the new company turned its endeavor to perfecting and
manufacturing machine tools.

In 1864 Ebenezer G. Lamson secured control of the business.
Mr. Lamson interested Russell L. Jones to invest, and the new con-
cern became Jones & Lamson. In May, 1876, it was incorporated
as the Jones & Lamson Machine Co. In 1880, Adner Brown and
Amesa Woolson purchased the business and moved it to Springfield.
James Hartness became superintendent, and in 1900 its president.

The product of the Jones & Lamson Machine Co., automatic tur-
ret lathes, is known throughout the industrial world.

Not alone in firearms did these workmen in the Robbins & Law-
rence plant excel. Charles E. Billings and Christopher Spencer
founded the Billings & Spencer Co., the largest drop forging company in the world. George A. Fairfield founded the Weed Sewing Machine Co., and with Mr. Spencer, the Hartford Machine Screw Co., the concern that introduced the automatic screw machine. Frederick Howe founded the Brown & Sharp Manufacturing Co. Henry D. Stone with Mr. Howe built at Windsor the modern turret lathe, Howe at Windsor the Lincoln milling machine; Henry D. Stone and Edwin Clark, the White sewing machine. Hiram Berdan invented the Berdan rifle; Albert Bell, the Bell repeating rifle, and he also founded the Sullivan Machine Co. William Palmer invented the Palmer carbine, Quimby Backus, the Backus vise. Frederick D. Wells founded the Greenfield Tap and Die Co. George Coates invented the Coates clipper machine and the flexible shaft. Henry D. Stone, Ebenezer G. Lamson, and Russell L. Jones founded the Jones & Lamson Machine Co.

No words of mine can express a deserving tribute to these Windsor workmen, who in the small inland town of Windsor conceived and built those mechanical devices that in no small measure promoted the mechanical development of to-day.

To Springfield, Vermont, we should give large credit for inventive genius and accomplishments. Over 200 patents have been granted to Springfield inventors. John Davidson and Frederick Parks invented machines for finishing woolen cloth, made a rotary churn, a vibrating machine for shearing sheep, and founded the Parks & Woolson Machine Co., which now manufactures textile machinery.

David Smith invented the only lock that cannot be picked, the first lathe dog, the split clothespin, the blanket hook and eye, used in the Army and Navy, the corn-planter, an adding machine, a breech-loading rifle, and many other improvements in machinery. The Rev. Pinckney Frost patented the scythe snath; the brothers, Joseph and Isaac Frost, the harness hame; Jesse Warren, the Warren land plow; Joel Ellis, in 1848, a steam shovel that was used in building the early Vermont railroads. Luke Taylor patented a mop, and B. B. Coates a wringer for Taylor's mop. A. J. Fullam invented the hair clipper (the grandfather of the one the barber uses on your neck); Noah Safford the hay cutter; Alvin Mason, a machine for making hooks and eyes; Joel Ellis a steam shovel, jointed dolls, and toy carts; Jonathan Woodbury, a sweep horse-power machine; L. T. Guernsey, improvements in a printing press; Herbert Warren, improved gravel roofing; F. B. Gilman, the Gilman lathe; W. L.
Bryant, the Bryant chucking grinder; F. I. Weatherhead, a harness check-hook. James Hartness was granted his first patent when twenty years of age, and he secured over 100 patents during his lifetime. I have mentioned only a few of these early Springfield artisans, but sufficient to justify Springfield in claiming her title of "The Cradle of Industry."

In 1796, there came to Brandon, one John Conant, of Ashburnham, Mass. He bought a one-half interest in the mills and water-power in the village of Brandon for $930. A few years later he purchased the entire water-power, and in 1816 built a stone grist mill at the head of the lower falls.

All the stoves used in Vermont were supplied by a Troy, N. Y., concern, who had their stoves cast in Philadelphia.

In 1819, Conant made the first Conant cook-stove, the first cook-stove made in Vermont. This was a stove with an oven and boiler. In 1820, Conant erected furnaces, and made his castings from Brandon brown hematite ore. Traces of his furnaces may still be seen outside Forestdale village, on the Rochester road.

Back in the dim, unrecorded ages, an ingenious soul invented the steelyard, a form of balance, so the dictionary says, "to which the body to be weighed is suspended from the shorter arm of a lever, which turns on a fulcrum, and a counter poise is caused to slide upon the longer arm to produce equilibrium, its place upon the arm (which is notched or graduated) indicating the weight." This was the scale, or balance, used by men of all ages, up to 1830.

In 1815, Major Joseph Fairbanks came from Brimfield, Mass., to St. Johnsbury, and started a saw and grist mill on Sleeper's River. With him came his three sons, Erastus, Joseph, and Thaddeus. They operated a small wheelwright shop and a foundry, and made anything that the neighbors wanted—plows, stoves, and farm tools. Thaddeus wanted to weigh a loaded cart, and from his contraption of chains dropping from a steelyard and grappling the axles he evolved the platform scale. He received his first patent June 13, 1831. Before his death in 1886 he had had thirty-two patents on improvements in scales granted him.

Thaddeus Fairbanks was not the only person who had scales on his brain. Up in the little town of Waterford, in 1834, the brothers Elias and Asa Hubbard patented a three-point suspension scale—the basic principle which is used for all heavy-weight scales. The Hubbard brothers also patented the counter scale with detachable scoop.
Both these patents the Hubbards sold to Thaddeus Fairbanks in 1840.

The first Fairbanks manufacturing plant was a wooden building 25 x 60 feet and contained the tools for making the scales, the warehouse, and the sales room. From this small beginning, with a capital of $4,000 has grown the E. & T. Fairbanks and Co., of St. Johnsbury, the largest scale plant in the world.

Bishop, who wrote *History of American Manufacturers*, says of Vermont, “Iron ore exists in nearly every variety and in great quantities in several counties, especially those lying along the western base of the Green Mountain range.”

In Tinmouth, in Rutland County, there were ten or twelve forges in 1798; an iron mine was opened as early as 1785. A large forge was built in 1791 on Furnace Brook in Pittsford. In 1794, Rutland County contained 14 iron forges, 3 furnaces, and a slitting mill. It was from the Tinmouth furnaces that the National Hydraulic Pump Co. of Windsor secured its iron.

Isaac Tyson, Jr., was born of Quaker parents in Baltimore, October 1, 1792. His father was a wealthy shipowner. Isaac began his career as mate on one of his father's ships. The ship was wrecked on the south coast of France. Young Tyson was rescued, and his return home was arranged by the U. S. Consul. While waiting for a ship, he visited an iron mill. Upon his return home he prospected in the Maryland hills and found a deposit of chromate of iron at Bare Hills. On February 15, 1827, he patented a method of making copperas by smelting copper pyrites and in 1829 began the production of copper at Strafford, Vermont. How he happened to come to Vermont, and the town of Strafford, history does not tell us. Mr. Tyson wandered over the Vermont hills and in the fall of 1835 discovered black oxide in Plymouth.

A Mr. Martin, his mining expert, employed at Strafford, examined the Plymouth region and found not only rich iron beds but also limestone for flux, and acres of timber for charcoal. Mr. Tyson at once purchased hundreds of acres of ore, limestone, and forest lands in Plymouth. In November, 1836, Mr. Tyson, Thomas Emerson, Albert G. Hatch, and Jones Dudley incorporated the “Windsor & Plymouth Ascutney Iron Co.” Mr. Emerson was a speculator; and before the iron company got started, Mr. Emerson's speculations caused the failure of the Windsor Bank, and placed Mr. Emerson
in the county jail. The bank failure was a financial disaster to Windsor.

Mr. Tyson opened his iron mill in 1837, a short distance west of what is now the village of Tyson, on the shore of Echo Lake in Plymouth. Another mill was located on Weaver Hill about three miles east of Tyson village. The usual charge of the furnace was 12 bushels of charcoal, about 1200 lbs. of iron ore, and 200 lbs. of limestone. The ore contained about 50 per cent iron, and burning 100 bushels of charcoal produced one ton of iron.

The workmen at the furnace were a mixed lot. French woodchoppers from upper Canada, charcoal burners from Germany, Irishmen from everywhere, and Negroes. The largest number were the Irish, and the remains of their settlement is still called “Dublin” by the natives of Plymouth. The ordinary workman received $14 to $18 per month, the moulders $1.25 to $1.50 per day, the foreman, $500 per year. In the year 1840, 600 tons of iron were produced at Tyson and sold at $35 per ton. A foundry was also operated and casting sold at 4 to 5 cents per pound.

Mr. Tyson operated the business until 1855 when he retired and died in November, 1861. The works were idle until 1864 when they were started again by a Boston corporation. This new company furnished the iron used in building the U.S. “Monitor.” During the latter days of the Civil War the Tyson iron sold for as high as $100 a ton. When Pennsylvania and Alabama iron and coal fields were opened, the Tyson iron fell in price to $20 per ton, and the iron industry of Vermont became only a memory. To-day on the site of the furnace is a steam-power sawmill, the only Tyson industry, a few decaying buildings in “Dublin,” and mines hidden by small trees and bushes.

Let him with an exploring mind turn at Echo Lake Inn, owned by Mr. and Mrs. Frank Bacon, and go up the Nineveh road, past the schoolhouse on the right. When he comes to a stone culvert over a small brook on left side of road, he will find a path that will lead him to the old mines. If he returns by the highway, he will see on the flat to his right the location of the since forgotten village of Dublin, where lived, in the prosperous days of the industry, 175 employees of the company. Located on the brook above the schoolhouse was an up-and-down sawmill where was sawed the lumber used for the construction of the buildings. Opposite and east of the schoolhouse one can see the walls and furnace foundations of the top
house and blast furnace. Here also is a pile of quartz used as flux in the furnace, and one can pick up samples of the ore, broken ready for the charge.

The few remaining old houses were built by Isaac Tyson, Jr., also the foundry and other buildings, but the exact location of the foundry is in doubt. Power for the bellows at the furnace was obtained from an overshot water wheel 32 ft. in diameter. The bellows made a dismal groaning sound and reverberating from the hills across the lake gave the lake its name—Echo Lake.

Many of the workmen lived in little huts covered with earth, made warm and comfortable. Their work was hard and long hours as the kilns had to be watched and fed both night and day. The only substantial evidence of past activity is the Congregational Church in Tyson village. The first money paid for its foundation was $100 given by James Tyson, son of Isaac, Jr.

The Echo Lake Inn is well worth a visit. For over 150 years it has cared for the travelling public. From the days of the cattle drovers, and later the iron buyers, to the vacationers of to-day. Its old walls, sturdy construction, and antiques will delight the visitor.

In many other things Vermont has taken the lead. The first copper coins were minted by Reuben Harmon, Jr., of Rupert, in 1785, under an exclusive right of coining copper in Vermont, which right was by act of the Representatives of the freemen of the State of Vermont in General Assembly met, and by authority of the same, held at Norwich June 15, 1785. "All coppers by Harmon coined, shall be in pieces of one-third of an ounce, Troy weight each, and devices and mottoes shall be agreed upon, by the Committee appointed for the purpose by this Assembly."

Harmon constructed a small workshop, that, by courtesy, we will call a mint, in the northeastern part of Rupert, on a small stream, called Mill Brook, a tributary of the Mettawee River. This building was 16 x 18 ft., made of rough, unplaned and unpainted boards, sawed by an up-and-down saw. Here Harmon made about 30 coins per minute.

The device on the coin—on the obverse—was a sun rising, with mountains and trees in the foreground, and a plow in the field beneath, also the words, *Vermont ensium, Res Publica*, and the date. On the reverse there was a radiate eye, surrounded by thirteen stars, also the words, *Quarta Decime Stella*, in English, "The Republic
of the Green Mountains, the fourteenth star.” The coins were legal
tender for one cent, and 1,000 lbs. of copper made 50,000 coins.

James Wilson of Bradford, in 1799, completed the first artificial
globe made in America.

One day in 1814, Silas Hawes sat in front of his blacksmith shop in
the village of South Shaftsbury. A peddler drove up and wanted his
horse shod. The peddler had no money, so Hawes accepted some
worn-out saws for his labor. Then Silas Hawes tried a scheme. He
welded two thin pieces of the saw steel together to form a square, and
the first steel carpenter’s square was made. They still make them
at the Eagle Square Manufacturing Co.'s plant in South Shaftsbury.

Hiram Kimball of Stockbridge invented the saw for cutting marble;
Otto Ulrichson, the marble planes.

Jeremiah Hall of Middlebury, in 1806, originated the circular
saw, but failed to secure a patent. Mr. Crane in his *Let Me Show
You Vermont* has another version. He says Tabitha Babbitt, a
Shakeress of Massachusetts, made the first circular saw in 1803, three
years before Jeremiah Hall.

The Estey Organ Co. was founded by Jacob Estey when thirteen
years old with a capital of twenty-five cents. That sum was given
him as a consolation prize at a spelling bee. Estey was born in Hins­
dale, N. H., in 1814. When twenty years old, he came to Brattle­
boro and started a plumbing shop. In 1846, Samuel Jones and his
brother Joseph, started a business making melodeons. They took in
John Woodbury, Riley Burdett, and Asa Field. Burdett wanted to go
to California with the “forty-niners,” so Jacob Estey bought him out.
The shop was burned in 1857. It was rebuilt on the opposite side
of the street, and burned again in 1864. It was rebuilt, and again
destroyed by the great flood of 1869. Jacob Estey’s son-in-law,
Levi K. Fuller, later a governor of Vermont, was taken into the
business. A new plant was built in 1870. In 1890, 1200 organs
a month were built. In July, 1892, when the 250,000th organ was
completed, the event was celebrated, and Brattleboro’s prima donna,
Mary Howe, sang to the accompanying music of that 250,000th Estey
organ.

In 1856, January 15, a patent was issued to F. M. Strong, of
Vergennes, and Thomas Ross, for a weighing machine, and in 1857
Strong and Ross began the manufacture of scales under their patent
at Brandon. In 1857, Strong and Ross made a scale for the Morris
Canal Co., of Washington, N. J., a scale with a capacity of 200 tons,
and a platform 70 ft. long, with one end 7 ft. higher than the other, used in weighing canal boats. In 1864, the company failed and the property, consisting of eleven acres in the center of Brandon village was sold at auction to Nathan T. Sprague. Mr. Sprague reorganized the company and continued the business, employing in 1874, 250 men. In 1876, the business outgrew its quarters in Brandon. John B. Page became president and moved the plant to Rutland. Upon the death of Mr. Page, a governor of Vermont, John A. Mead became president. The Howe Scale Co. covers 22 acres, employs 700 men, has branch warehouses in 16 cities, and is capitalized at $2,000,000.

The largest industrial corporation in Vermont began its activities when, in 1836, Willard Humphrey and his brother Moses began quarrying marble near the Humphrey homestead at Sutherland Falls. A number of different companies were organized between the years 1836 and 1867. The last concern, the Sutherland Falls Marble Co., made an assignment in 1869, and Redfield Proctor came into the picture, as receiver. In 1880, the Vermont Marble Co. was organized with Redfield Proctor as its President.

Its activities have been extensive—75 quarries, 1,000,000 cubic feet of finished marble per year, mills and plants at Proctor, Center Rutland, West Rutland, Florence, Brandon, Middlebury, Swanton, Roxbury, Danby, Dorset, Manchester (eleven Vermont towns), and Bluff Point, N. Y., San Saba, Texas, Tokeen, Alaska, and branches in all the large cities (and fifty salesmen on the road).

The Rev. John A. Dodge of Monkton, in 1818, invented and constructed the first sewing machine. He never attempted to manufacture it because of the opposition of journeymen tailors, and because, as a pastor, his time was not his own.

The first postage stamp used in America was made in Brattleboro in 1846. Only one uncancelled Brattleboro stamp is known to be in existence, and its value is a small fortune.

I would be lacking in respect, if I failed to mention those two truly great Vermont thinkers—Samuel Morey and Thomas Davenport. Samuel Morey, in 1793, long before Fulton launched his “Clermont,” operated his steamboat on the Connecticut River, and later, disappointed and discouraged, sank his boat beneath the waters of Lake Morey. Thomas Davenport, fifty-nine years after his death, was recognized by the plain monument erected to his memory, at Forestdale, marked 1802-1851, as the inventor of the electric motor.
His invention helped more than any other invention to advance America's progress.

Vermont is small in acreage, small in population, only about 9,000 square miles with 360,000 people, yet she leads her sister states in the production of marble, granite, talc, slate, and asbestos. She has many small industries, and some have a national reputation. A. N. Wetherbee of Lyndon makes spinning tops for all the world. Washington County makes the spring clothespins for the Monday wash; Fred Smith, at Moscow, the parcel handles for milady's shopping tour. Winooski supplies the world with screen doors and screens for windows. Waterbury makes the scythe snaths, and East Highgate the scythes. Up in the little town of Wheelock, L. N. Cree makes flexible steel tubing.

One day in 1890, J. T. Shepley rode from Newport to Sheldon on a bicycle, looking for a site for a pulp mill. He found a mill-site at Sheldon Springs, a drop of 75 feet in a distance of 300 feet. Here Shepley built his pulp mill. In 1912, the mill was incorporated as the Missisquoi Pulp and Paper Co. and started making Bristol board at the rate of 7,000 tons per year. In 1925, it increased its output to 15,000 tons per year. It employs 225 men for 24 hours daily, and up to 1929 had never shut down for lack of orders.

Do you know that E. B. and E. C. Whiting Co. of Burlington is the largest manufacturer of Tampico and fibre brushes in the world; that the Bradley Corporation of Brattleboro makes penholders by the million; that the Batchelder Plant of the American Fork and Hoe Co. at Wallingford ships garden tools to nearly every civilized country on the globe; that the Newton-Thompson Co. makes more wooden toys than any one other small-wood toy concern in New England; that the Gilman Paper Co., generates 8,600 H.P. and that the daily output of the mill is four carloads of paper bags each working day; that down in Readsboro the Readsboro Chair Co. has for a number of years furnished the deck chairs and settees for the Cunard Lines?

May I mention other inventors and industrialists whose boyhood days were spent in Vermont?

Ezra Eddy, born in Bristol, the "Match King" of Canada.

William Wallace Chandler of Randolph, inventor of the refrigerator car.

Jefferson Chase of Concord made the first pails and tubs from wood pulp.
William B. Clapp of Montgomery, first man in America to can meat.

John Heman Converse of Burlington, head of the Baldwin Locomotive Works.

Charles Henry Deere of Derby made the first steel plow.

The following sketch of Charles Henry Deere was written by Stella Burke May and appeared in an issue of American Agriculturist.

With rifle, ax and plow the pioneers began the development of America. Where game was plentiful or Indians hostile, they used the rifle; in wooded country, the ax. But out in Illinois, when John Deere arrived in 1836 wood was scarce and Indian warfare just ended. The plow was indispensable. It wasn't the iron plow that broke the gravelly soil of New England and which settlers carried West with them. The iron plow had worked fairly well in virgin prairies where thick sod held the sod together, permitting a clean furrow. But after ground had been plowed once and the sod broken, the moist sticky loam of the Middle West clung to the iron plow and rolled itself into mud mountains. Not even two teams of oxen could draw a clean furrow. Farmers were desperate. A better plow was needed. John Deere made one: a steel plow that broke the prairies and opened up the bread basket of the world.

"I cut the teeth off a mill saw with a hand chisel," he said. "I heated the steel on the forge, a little at a time, shaping it as best I could." That—in brief—is the story of America's first steel plow.

John Deere was a blacksmith. Back in Middlebury, Vermont, where he had passed his boyhood and served his apprenticeship, he had made shovels and hayforks, iron rims for wagon and stagecoach wheels.

Vermont had emerged from the ax and the rifle stage. Vermonters were going "out West" to seek new fortunes. One Vermonter, Leonard Andrus, an ex-Army major, had gone to Illinois in 1834 and settled on the high-wooded banks above a horseshoe bend in Rock River. Grand Detour was its name. Andrus built a sawmill and prospered. He returned to Vermont and persuaded some relatives and friends to go West with him, among them his father-in-law, Amos Bosworth, who owned a stagecoach and freighting business and for whom John Deere had worked. Deere joined them, leaving his wife to follow later with their children, and arrived in Grand Detour with his blacksmith's tools wrapped in a leather apron, and $73.73 in his pockets. He was six feet tall, with muscles of iron. His blue eyes looked out upon a world that rolled westward to the setting sun. The prairie wind ruffled his wavy hair. He was thirty-two years old. He built a forge with stones from Rock River, using clay for mortar. With that finished he was ready for customers. Farmers from miles around with broken tools came to his forge. Plows predominated—iron plows broken by the pull of the team in the heavy loam. Yes, the settlers needed a better plow—of that the blacksmith was sure. A plow that would scour through the sticky mud leaving a clean furrow for planting. One day, visiting Leonard Andrus's sawmill, Deere noticed a broken circular saw blade made of Sheffield steel. The steel shone like a mirror.
Carrying the broken saw back to his forge, Deere cut off the teeth with a hand chisel; made a paper pattern of a moldboard and share and with chisel cut the steel to pattern, heating it at the forge and shaping it with a wooden mallet to prevent denting. Upright standards of bar iron; a sapling with roots bent for a handle; a piece of fence rail for a beam—and America's first steel plow was ready for trial. It was a self-scouring plow, strong enough to endure in heavy soil but light enough to be carried on a man's shoulder. With Lewis Crandall's horse to pull it and Crandall's heavy bottom land to test it, John Deere gave his plow a trial. The steel share pierced the soil. The steel moldboard curled back the heavy loam, leaving a clean furrow. When the field was plowed, share and moldboard were bright and shining as ever. It polished itself! John Deere built a five-room house and sent for his wife and five children, the youngest born since he left Vermont. That first year he sold one plow, the next year three; the year after ten; and all the time he carried on his blacksmith's trade. By 1842 he was selling two plows a week. He and Andrus entered into partnership and built a brick factory. In 1846 the partnership was dissolved, and Deere moved his plant to Moline, where his product was carried by river steamer when navigation was open, by wagon routes when it was closed. When John Deere died, in May, 1856, his son Charles, born in Vermont while his father was pioneering in Illinois, took over the business. But until his last days, Deere, Sr., never forsook his forge.

The little white cottage where John Deere welcomed his family from Vermont still stands. A monument to the past, its windows look out across a nation transformed by the man who beat a saw into a plowshare.

William Harvey, born in Wardsboro, made the first gimlet pointed screw; Charles Ira Hood of Chelsea was the originator of "patent medicine"; Graves Elisha Otis of Halifax invented the Otis elevator; Lysander Rice of Windsor invented the roller process for making flour; James Sargent of Chester was inventor of the first successful time lock; Philo P. Stewart of Pawlet, the horse rake; John T. Winslow of Bennington invented the "Monitor," the first iron clad ship; Joseph S. Mott of Alburg, the first wood-planing machine; Isaac Fischer, Jr., of Springfield was the inventor of sandpaper.

Pages could be written regarding the growth and development of the marble, granite, slate, talc, copper, and asbestos industries in our state.

Vermont has an interest in the Byrd Antarctic Expedition as the dyes used in coloring the tents and flags are made by the Wells and Richardson Co., Inc., of Burlington. Orange and black colors have the greatest visibility and prominence against ice glare. From a plane orange stands out better against snow than any other color.

Vermonters have always been industrious, inventive workers. In the days prior to the Civil War, they, of necessity, depended upon
their own initiative for the requirements of their lives. The small industry was, and is to-day, the symbol of progress.

Vermont will probably never be a leading industrial state. In material wealth she is the poorest state in New England. It is said that Vermont towns have no future. But to-day there is no cheap land in the West to lure Vermont's sons and daughters to the virgin soil of the prairies. Here in Vermont is the opportunity of the future. The green hills and valleys of Vermont must play an ever growing part in her progress. Vermont is still the mother of men, and in the years to come, as in the past, the millions in our smoke-stained cities will look for clear-eyed thinkers to Vermont's everlasting hills.

*There are tales about Vermont*

*In history and in song.*

*Some have been written rightly,*

*And others written wrong.*

I leave this paper for you to judge! If you question statements made—then I must refer you to authorities I have consulted.

[Mr. Putnam lists among his authorities and references, Hemenway, Zadock Thompson, Arthur F. Stone, Walter H. Crockett, Charles E. Crane, Edward Conant, Guy Hubbard. Editor.]